the Citrus Industry

Florida Citrus Growers Have Been Fortunate

Nature has been kind to Florida citrus growers so far this season. With hurricanes screaming around our shores in the Atlantic ocean and the Gulf of Mexico, growers were kept on the anxious seat for days at a time. But Nature was good to us; only one of the numerous threats materialized, and that with much less severity than had been feared. While there were individual losses, the state as a whole escaped with only minor loss.

Then came the threat of a freeze the like of which has not been known in recent years. But here, too, a kind Nature stepped in to minimize the danger. Where threat of a disastrous freeze kept growers firing smudge pots and losing sleep, only the most exposed groves suffered any damage, and that of minor importance.

And not only Nature has been kind to Florida citrus growers. When a slump in prices on the auction markets threatened, prompt action in the curtailment of shipments warded off disaster, prices rallied and growers are now looking forward with confidence to a period of favorable prices and a profitable season — if Nature continues to favor us and the war situation does not become too serious.

Florida citrus growers have certainly been on the long end of natural and artificial conditions so far this season. Of course, the excellence of our citrus offerings has had something to do with it.

Vol. 31, No. 12 December, 1950

Extra PROFITS *for* FLORIDA GROWERS

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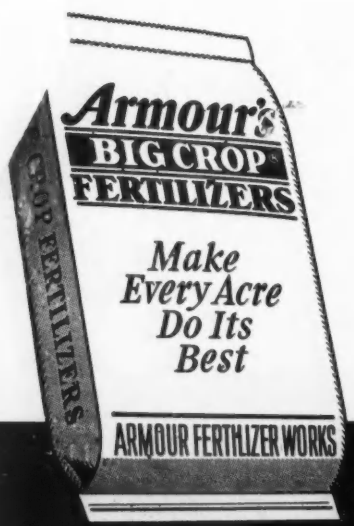

Citrus trees produce more high quality fruit that brings extra profits when fertilized with the scientifically balanced plant foods in Armour's Big Crop Fertilizers. Hundreds of successful growers have proved this fact to their own satisfaction — year after year.

If you are not already giving your trees the many benefits of this top-grade plant food, why not start now? Place your order at once for Armour's.

An Armour Field Representative will gladly call at your convenience to discuss your grove problems. No obligation. Just drop us a postcard.

ARMOUR FERTILIZER WORKS
JACKSONVILLE, FLORIDA

Citrus Insect Control For December 1950

J. T. GRIFFITHS, W. L. THOMPSON AND R. M. PRATT*
CITRUS EXPERIMENT STATION
LAKE ALFRED, FLORIDA

During December the major spray problems on citrus will be concerned with the control of rust mites and purple mites. Both of these mites have been relatively prevalent during the month of November.

According to reports from over the entire state**, purple mite infestations are generally on the increase. In some individual groves, purple mite populations have reached severe proportions and there have been some reports of mesophyll collapse and extensive leaf drop. Although severe infectations are found over the entire state, the most general infestations appeared to be in Lake and Orange Counties. In general, more mites will be found in groves that were sprayed with parathion than with oil during the summer scale control period. The increase of mites in these groves was due to the fact that the parathion did not control the mites as satisfactorily as the oil emulsion sprays. There is no evidence to date to indicate unusual increases of purple mites following applications of parathion.

Rust mites have increased in many groves during the past 30 days. In groves where sulfur has not been applied, increases have been rapid in many cases. It would be wise to check all groves at this time to be sure that rust mite infestations have not reached serious proportions. During the winter months examine the leaves as well as the fruit since rust mites are difficult to see on fruit that has colored, and where more than a 15 to 20 percent infestation is found, applications of sulfur are indicated. Even though the fruit may have been picked in some groves the rust mite population should be kept at a minimum to prevent leaf drop and greasy spot.

Spray Recommendations.—Sprays which will be applied during the early part of December should include wettable sulfur for rust mite control and DN for purple mite control. In view of the 1949-50 experience with purple mites, it is strongly recommended that DN be included in all sulfur dust or spray applications. DN applied in early December will not be sufficient in most years to insure purple mite control throughout the spring. Thus a second application of DN will probably be necessary. If DN dusts are substituted for sprays remember that adequate coverage is absolutely essential for the control of purple mites. If DN Dry Mix is not available, DN-111 may be substituted. This material should be used at 1¼ pounds per 100 gallons.

After December 20 some growers may wish to include zinc in their spray applications. This is a little early for zinc, but it may be applied satisfactorily at this time. To decrease residues, it is suggested that neutral zincs be substituted for zinc sulfate plus lime. The use of neutral zincs will aid in formulating sprays containing DN or parathion, since no alkalinity problem is involved. After December 20, a spray containing zinc, DN, and sulfur may be applied. It should be emphasized here that the grower cannot expect satisfactory control for a long period from a DN applied this early in the year unless the mite population is low. Again, thoroughness of application needs to be emphasized when planning prolonged control with DN in December.

If scale continue to be a problem in some groves, parathion may be incorporated in the sprays during December. It is recommended for such applications that parathion should be used at 1 2/3 pounds of 15 percent wettable powder per 100 gallons. Where possible this should be applied on warm, calm days. Oil sprays are not recommended during December.

For more specific information consult the Florida Citrus Experiment Station, either at Lake Alfred or Ft. Pierce.

*Written November 25, 1950.
**Reports of surveys by Harold Holtsberg, Cocoa; J. K. Enzor, Jr., Tavares; K. G. Townsend, Tampa; and J. B. Weeks, Avon Park.

Oriental Fruit Fly Threat . . . .

The appearance of the Oriental fruit fly in the Hawaiian Islands in 1947 has presented a real threat to mainland agriculture if it should become established here.

Buildup of the fly in the Islands is a typical example of the behavior of a species newly introduced into a very favorable habitat, without any of its natural enemies. The extremely large lists of hosts recorded in the Islands, which includes practically every type of fleshy fruit or pulpy seed found there, is undoubtedly due to population pressure resulting from this situation. If and when this pressure is relieved, most of these hosts should not be a factor. There are grounds, however, for believing that the reemaining hosts would still include deciduous and citrus fruits, nuts, grapes and even cotton, all of which are of major economic importance to California.

Rough plans have been prepared by the State Department of Agriculture which will permit immediate action in the eradication of any incipient infestation should one be discovered. Such plans, however, are being kept highly flexible so that they can be revised to meet existing conditions and use the most effective materials and measures available at the time. They include an inventory of all available mechanical equipment that might need to be drafted for the job and lean heavily on the agricultural commissioners for assistance in carrying out the actual eradication measures. Legislature authority has been established for reimbursing growers for losses that might result from such measures.

—Briefed from the 13th annual report of the California State Department of Agriculture.

Car Supply Studied By Growers & Shippers League

A matter of extreme importance to all shippers by rail "Car Supply" has been receiving in recent months some very careful and thorough consideration not only by private industry, but by the Chairman of the Interstate Commerce Commission and several of our congressional representatives.

Frankly railroad equipment is very short of being anywhere near what could be considered adequate and this does not pertain solely to refrigerator cars, but to all types of cars.

At the International Apple Association's convention, held the second week in August in Washington, a great deal of attention was given to this subject and the Refrigerator Car Committee of the United Fresh Fruit and Vegetable Association also met with the Railroad Committee from the Association of American Railroads.

According to Mr. John Kelley, Chairman of the United's Refrigerator Car Committee, there is reported to be 108,000 refrigerator cars in service on the railoads today, but it is his opinion that at the present time there are actually less than 100,000 refrigerator cars and possibly 95,000 cars would be a safer figure, and of this 95,000 cars only about 65,000 are in really serviceable condition, or as Mr. Kelley put it bluntly, fit to be in service.

Before World War II or in 1939, there were some 124,000 refrigerator cars in service, so that we now show a net loss of some 50,000 cars assigned to perishable food traffic. In other words, refrigerator cars have been wearing out faster than they are being replaced by new cars.

In a recent letter I received from Mr. John C. Hill, President of the Fruit Growers Express Company, he advised that his associated companies, the BRE., FGE. and WFE were operating about 20,400 refrigerator cars. Since January 1, 1946, they have

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Present Status Of Spreading Decline . . .

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The investigation of spreading decline of citrus in Florida has been in progress for the past five years. During that time information on the varieties of citrus and the rootstocks on which the decline was found has been reported (1). In addition, the effect of the disease on the trees (1) and the rate at which the decline spreads in the grove have been discussed (1, 2). At one time it was considered that the citrus nematode (**Tylenchulus semipenetrans** Cobb) might be associated with spreading decline (1) but subsequent results showed that the citrus nematode was not the causative agent for typical spreading decline (2). In the experimental work on virus transmission, no evidence was found to indicate that the disease was caused by a virus (1, 2). Although preliminary investigations did not indicate that a fungus was responsible (7), it appears that the trouble may be the result of a fungus infection of the fibrous roots that gradually spreads through the grove from root to root (2). Numerous experiments with various types of possible control measures were conducted but no successful method for the control of the disease was found (1, 2).

Considering all of the information already obtained and the additional results accumlated since the last report in 1949, what is the present status regarding spreading decline?

Spreading decline occurs on all varieties of oranges, grapefruit and tangerines budded on rough lemon, sour orange, sweet orange or grapefruit root stock. The presence or absence of the disease on other kinds or rootstocks has not been determined. The number of groves in which typical spreading decline is present are located as follows: Polk County—74, Orange County—8, Highlands County—5, and Hillsborough County—2, making a total of 89 groves. There are a number of groves in which spreading decline occurs that we do not have on our list.

Those trees which have spreading decline show sparse foliage and reduced growth but do not die. The trees within the decline area all show the same degree of decline and a distinct margin is evident with the decline trees on one side and the healthy trees on the other. The disease gradually spreads from the declining trees to the adjacent healthy trees.

RATE OF SPREAD

To determine the rate of spread of the disease, the groves are mapped each year after the spring flush of growth. The yearly maps are then compared to obtain the number of trees that became diseased during any given year. Since the decline spreads at the margin of the diseased area the rate of spread is obtained by dividing the number of trees that become diseased by the number of trees on the margin of the decline area. The results obtained from 25 selected groves are presented in Table 1. These data show that considerable variation occurred in the rate of spread in the various groves from 1945 to 1950. The maginal rate of spread varied from 0.1 to 8.3 trees with an average of 1.6 for all groves throughout the five years. Six groves showed an average rate of spread of over 2.0 for the five year period. The greatest average yearly spread was in 1948-49 when the rate was 2.7. In general, spreading decline can be expected to move outward 1 or 2 trees per year.

To demonstrate the total number of trees that may become diseased over a period of years, the data obtained from 8 groves was examined. These groves had been mapped six times and complete records for the five year period were available. As is shown in Table 2,

*A paper presented at the sixty-third Annual Meeting of the Florida State Horticultural Society, November 1 and 2, 1950 at Winter Haven, Florida.

the number of diseased trees in the groves varied from 13 to 164 when they were mapped in 1945. By 1950, the number of diseased trees varied from 138 to 511. Grove No. 4 showed the largest increase but also had the most

Table 1.
Yearly Variation in Rate of Increase of Spreading Decline in 25 Groves.

Grove	Rate of Spread*					Average
	1945-1946	1946-1947	1947-1948	1948-1949	1949-1950	
1	1.6	1.1	0.3	2.5	out	1.4
2	1.2	1.4	0.6	2.8	1.0	1.4
3	1.0	0.8	0.7	0.9	2.7	1.2
4	1.1		1.4	2.3	2.3	1.8
5	0.2	1.7	1.8	2.7	1.3	1.5
6	0.7	1.5	0.9	1.5	1.6	1.2
7	1.0	2.0	1.0	3.0	0.5	1.5
8	0.3	0.8	0.7	1.3	out	0.8
9	0.5	1.1	1.3	2.8	0.8	1.3
10	0.6	0.6	1.6	3.8	2.3	1.8
11		1.1	0.7	2.0	1.5	1.3
12		2.3	0.7	2.0	out	1.7
13		1.9	1.9	2.2	0.6	1.7
14			1.1	4.7	0.5	2.1
15			1.1	5.2	1.5	2.6
16			2.0	3.0	1.8	2.3
17			1.8	1.1	0.5	1.1
18			0.9	2.7	0.5	1.4
19				3.2	8.3	5.7
20				4.1	0.9	2.5
21				2.6	1.0	1.8
22				2.7	0.6	1.7
23				1.5	1.0	1.3
24				1.6	0.6	1.1
25				4.3	0.1	2.2
Average	0.8	1.4	1.1	2.7	1.5	1.6

*Increase in number of diseased trees per tree on the margin of the declining area.

Table 2.
Increase in Number of Diseased Trees in Affected Groves During a Five Year Period.

Grove	No. Diseased Trees		
	1945	1050	Increase
2	13	138	125
3	77	244	167
4	164	511	347
5	121	296	175
6	21	199	178
7	29	142	113
9	51	152	101
10	66	249	183

diseased trees in 1945. However, the increase in number of diseased trees was not always greater in the groves that had more diseased trees at the beginning of the experiment as illustrated by comparison of the data from groves 5 and 6. Apparently the conditions in some of the groves were more favorable for the development of spreading decline.

CASUAL AGENT

Spreading decline appears to be the result of a disorder of the fibrous roots of the tree. No evidence has been found to indicate that the disease is caused by virus. Although the citrus nematode is present in a number of groves in Florida, it was not found in groves which have typical spreading decline. Two kinds of fungi can be consistently isolated from the fibrous roots of the diseased trees. One is **Fusarium** sp. and the other has not yet been identified. It is probable that the spreading decline is caused by a fungus infection of the fibrous roots. A number of experiments are in progress to determine whether either of these two fungi may be the casual agent.

One characteristic of a Fusarium disease is the ability of the fungus to produce a toxic wilt-inducing material when grown in Richard's solution. This toxic material adversely affects the host when the disease occurs under natural conditions. In the case of spreading decline, a toxic material was obtained from water extracts of the fibrous roots, the woody portion of larger roots and the leaves from diseased trees. This toxic material caused the wilting of citrus cuttings within 48 hours and of tomato cuttings in 24 hours. Extracts from healthy trees did not cause a wilting of the cuttings. Fusarium cultures No. 16, 29 and 35 obtained from diseased trees were grown in Richard's solution for two weeks and the filtrate tested for wilt inducing ability. The filtrate from culture 29 was more toxic than that from the other two cultures in causing a wilt of citrus cuttings. Since a wilt inducing material can be extracted from the diseased trees and is produced by the growth of the fungus in Richard's solution, it is indirect evidence that the spreading decline may be the result of the infection of the fibrous roots by a Fusarium.

Experiments have been conducted and are in progress to determine the effect of soil from a spreading decline area, healthy grove soil and virgin soil on the growth of rough lemon seedlings and young Duncan grapefruit trees on rough lemon rootstock. In one series of tests, the seedlings in the decline soil show a reduction in growth compared to that of the seedlings in the other soils. It has also been found that Tenedergreen beans and sunflowers develop a greater amount of root rot when grown in soil from a spreading decline area than occurs when they are grown in soil from the healthy part of the grove. Both of the previously mentioned fungi have been isolated from the diseased bean and sunflower plants. In one instance, velvet beans were used as a cover crop in the spreading decline area of a grove. The stand was poor and about 50 percent of the plants showed root rot. A number of other kinds of plants will be tested for their susceptibility to root rot when grown in soil from a spreading decline area. If a satisfactory test plant can be found, it will be possible to evaluate the effectiveness of the various soil treatments more rapidly than can be done by growing citrus seedlings.

Table 3.
Respiration Rate of Fibrous Roots from Decline Trees and from Consecutive Healthy Trees in Advance of the Margin.

Tree No.	Condition of Tree	Microliters of Oxygen per Hour		
		Grove 1	Grove 2	Grove 3
0	Decline	15.3	23.4	22.5
1	Healthy	18.6	26.6	30.3
2	Healthy	22.5		
3	Healthy	34.3	38.4	41.2
4	Healthy	33.1		
5	Healthy	31.2	31.8	30.6
6	Healthy	29.2		
7	Healthy	28.8	33.8	30.8
8	Healthy	28.8		
9	Healthy	31.3	29.1	29.0

CONTROL MEASURES

Considering the evidence obtained, it is doubtful if a treatment can be found which will rejuvinate those trees that have spreading decline. Therefore to control spreading decline, two prob-

lems should be considered. How can we stop the spread of the decline in a grove? What soil treatment should be used before the area is replanted? In some cases, growers have attempted to control spreading decline by removing those trees which were visibly diseased. Within a few months those trees at the margin, which appeared healthy when the other trees were removed, began to show typical decline symptoms.

Before decline can be properly controlled it will be necessary to know the number of trees affected with the disorder which are located in advance of those trees showing visible symptoms. Since plant pathogens often affect plant metabolism a measurement of the rate of respiration of citrus leaves or roots should show whether differences exist in metabolic activity between apparently healthy trees in advance of the decline margin. A difference in metabolic activity might be indicative of the spread of the pathogen.

The rate of respiration of fibrous roots from healthy trees and decline trees was measured using 40 root tips from each tree. The root tips were suspended in a 2 percent glucose solution and placed in a Warburg respirometer at 33°C, where oxygen measurements were made at 10 minute intervals for a period of one hour. The rate of oxygen absorption by the roots secured from three typical groves is shown in Table 3. It was evident in every measurement that the rate of respiration of the decline trees was lower than the respiration rate of the healthy trees in the same grove. The data also indicate that in the majority of the groves tested there was a successive increase in respiration rate from the decline area up to and including the third healthy tree beyond the decline margin. In every grove the respiration rate was highest for the third or fourth healthy tree beyond the decline margin. The rate of respiration of healthy trees beyond the fourth tree was slightly lower than the third tree but usually higher than the first or second healthy tree. It was also interesting to note that the respiration rate was practically the same for all healthy trees in the same grove located more than 4 trees beyond the visible margin of spreading decline. Although these data are preliminary in nature it would appear that the decline causal factor had an initial sitmulating effect on the respiration rate of the third or fourth healthy tree. It would seem logical, therefore, that as the invasion became more severe the respiration rate was reduced as illustrated by the lower metabolic activity of the first and second healthy tree.

Table 4.
The Catalase Activity of Grapefruit Leaves from Consecutive Trees Across the Margin of the Decline Area.

Tree No.	Condition of Tree	Catalase as cc. of $^{0}2$ Released in 90 Sec.
1	Decline	15.7
2	Decline	20.2
3	Decline	17.1
4	Healthy	30.7
5	Healthy	34.0
6	Healthy	35.7
7	Healthy	30.4
8	Healthy	29.9
9	Healthy	29.3
10	Healthy	30.2
11	Healthy	28.3
12	Healthy	28.5

Table 5.
Hypothetical Loss of Trees by Pulling to Prevent Spread Compared to Actual Loss by Unchecked Spread of Decline.

Grove	Trees in 1945 Decline	Pulled	Total	Trees in 1950 Decline
2	13	99	112	138
3	77	97	174	244
4	164	174	338	511
5	121	133	254	296
6	21	105	126	199
7	29	68	97	142
9	51	82	133	152
10	66	88	154	249

Respiration studies are being continued and additional indices evaluated as an aid in the interpretation of the significance of metabolism in the third and fourth healthy trees beyond the decline area.

The activity of the catalase enzyme in the leaves has been used occasionally as an indication of the rate of metabolic activity. Sixty leaf discs were selected from each tree and ground while fresh with a mechanical mortar. Catalase was determined in Heinicke tubes rotated in a constant temperature water bath. The amount of catalase was expressed as the cubic centimeters of oxygen generated in 90 seconds when the sample was mixed with hydrogen peroxide. The catalase activity of the leaves secured from one grove is shown in Table 4 although the same general relation held for other groves that were tested. In general, there were greater variations in catalase measurements of the leaves than were apparent in the respiration rate of the roots. These differences may have been due to the greater experimental error in the catalase procedure. However, it is significant that in every grove tested the third or fourth healthy tree beyond the decline margin had the most catalase present.

Since a preliminary study of the physiology of the citrus tree has indicated some variation up to the fourth visibly healthy tree ahead of the margin of the decline area, it is probable that, if all of the diseased trees plus four or five good trees around the area were removed, the disease could be eliminated. Assuming that this procedure would be effective, what would be the result if this had been done in 1945 in the eight groves which we have studied? As is shown in Table 5, the number of diseased trees in every grove is greater now (1950) than the number of decline trees plus a margin of four trees that would have been removed in 1945. Arrangements have been made to try this procedure in three groves this winter. It will be two or three years before definite conclusions as to its effectiveness can be obtained.

Table 6.
Effect of Soil Treatment with D-D on Growth of Young Trees.

	Treated Soil	Non-Treated Soil
Caliper	1.91 in.	1.75 in.
Height	5.80 ft.	4.93 ft.
Spread	5.69 ft.	5.18 ft.

It is possible that a chemical barrier maintained in a grove might stop the spread of the decline. Such a barrier would need to kill the roots to eliminate the root contact and have some disinfecting action on the soil. Preliminary tests with cyanamid, formaldehyde and D-D (dichloropropane- dichloropropene) indicated that a for-

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Portable Irrigation On The Ridge . . .

MORTON HOWELL

Does Irrigation Pay? This question has been asked many times by Growers located in the Ridge Citrus Producing area of Florida. If it does not pay there has been millions of dollars very foolishly spent in the Ridge area, especially in the past two years. There are two methods of irrigation used in this area I am discussing. First, is with permanent installation of pumps with power units, using underground mains or conductor lines and either overhead sprinlers or portable spinkle or flooding lines. This type requires greater initial investment with less operational expenditures. The second type is with portable pumps and power units and portable conductor and distribution pipe. With a source of water available, this type of unit can be moved from property to property, thereby on an acreage basis reducing the initial investment but, increasing the operational expense. This method is used by many in the Ridge Section which has many lakes.

Do you know that many Growers who were dependent on Portable Irrigation during the past spring and summer, have more money invested in the present crop for irrigation than all the other production costs combined? Yes, when a property is far removed from a source of water, portable irrigation certainly does deplete the bank roll fast. This is true even if you own the equipment and not just when you hire it done. In addition, it is a job which has no end until it rains. When will it rain is the sixty-four dollar question.

In my opinion there are two types of irrigation. One is "Preventive" which implies not allowing the tree to develop a tight wilted leaf condition or soft fruit and the other is "Curative." This type is used in salvaging a crop or preventing mortality of the trees.

It is bad, but true that many Growers never plan on irrigation until it gets dry. Then those without irrigation get panicky and will pay virtually any price to obtain water. Unfortunately, in many cases this type of irrigation presents the greatest gamble.

My initiation to portable irrigation was with a worn out Buick motor and a low head centrifugal pump. The suction was a 22 foot length of 6 inch well casing. There were 400 feet of 6 inch 28 guage galvanized slip joint pipe for conductor line and 2,000 feet of 4 inch, 28 guage slip joint pipe for conductor and distribution line. The distribution was by the flood system. I had many experiences in attempting to keep water on the tops of some of those hills or preventing washing on the hillsides. Of course, keeping pipe together going up some of the steep grades sometimes produced a problem. The principal requirement then to operate that type of unit was the "Patience of Job." If we had the maximum of luck, we put water on part of ten acres in four twelve to fourteen hour days. As usual, during most dry periods we were working around the clock.

During the late thirties after two successive dry Springs with very little irrigation and much hauling of water in barrels to groves, some decent portable irrigation equipment began creeping into the picture. The pumps and power units were some better but the big improvement was in portable pipe. This was known as "Lock Joint Type". It was fourteen guage zinc coated steel with enlarged or bell type female end. Inside the female end was a rubber gasket. This gasket grew tighter as water flowed from the pump. Protruding from the female end were two or four receptacles so arranged that when the lugs, located on the male end, fitted into these recesses and the pipe was slightly turned, it locked. In addition to being virtually leak proof, under pressure, and slightly flexible, in the event of a power unit stopping and the foot valve on the pump suction not seating there would not be a vaccum created and causing the pipe to flatten. This was the case with slip joint pipe. The main trouble with that zinc coated steel pipe which was in sixteen foot lengths, was its weight. One man could carry it but with great difficulty. During the war years with a scarcity of labor, this presented an acute problem.

The labor problem and the increased use of aluminum after World War II was the next important step in Portable Irrigation. The production of portable aluminum pipe began to appear in this territory. This was a definite improvement. Not only a labor saver, which was greatly needed, but due to less pipe friction more water was pumped with less power through the same size pipe. With this type pipe, using 4 inch sprinklers one Grower's daughter in our organization handles the moving of the sprinkler lines by herself.

Along with aluminum pipe there developed more careful selection, by the buyer and seller, of the pump and power unit required for that particular job.

In the past a Grower bought a pump and obtained a power unit of some description and hooked them up. The power unit might gain maximum efficiency at 2,400 RPM and the pump at 1,600 RPM but it didn't make a great deal of difference. The main object was to have at least some water flowing at the end of the pipe.

At the present, one sees high head pumps, which pump a great deal of water with high pressure against much pipe friction and terrian elevation. Power units pull these pumps direct connected or belt driven. Most of them have a clutch which allows easier starting of the power unit and priming of the centrifugal pumps.

There are some Growers with properties not located near lakes which do the following: Drill a well and mount a turbine pump on the well with a gearhead and power take off shaft extended. They put the same size pump on the various wells. Then they use one power unit and their portable

pipe on all three or four properties.

In selecting equipment for use in portable irrigation much thought should be given to the subject. Such as height of property above level of water, size acreage, and distance from source of water. I am assuming that you would want the most economical unit to operate. Beginning with a smaller unit to be used on plots located on a lake consisting of ten acres or less. In this situation, a small power unit with small high head pump that will supply a minimum of 300 GPM with a maximum head involved, is sufficient. I would suggest 6 inch aluminum conductor lines and 4 inch aluminum sprinkler lines. This unit, after asembling, can easily be operated by one man. This type of grove would usually have a rather steep slope and therefore, you would not want very much water flowing. With less water, the soil will absorb it without washing. Your sprinkler lines would be approximately 330 feet in length. One 330 foot line would be operating while the other was being moved.

The next size unit would be a high head pump that would deliver 700—750 GPM with comparable power unit that would deliver the maximum of water required with a maximum of head to operate against. The optimum conductor line would be 8 inch aluminum or with less head, 6 inch would suffice. The sprinkler lines would be 5 inch or 6 inch aluminum of 660 feet in length per operating line. Where there is a maximum head to be operated against or where it is advantageous to use 990' sprinkler lines, I would sugpower unit. The Big Bertha of Portable Irrigation is the 1,500 to 1,600 GPM high head pump and power unit to match. This would use 8 inch aluminum conductor pipe with 6 inch sprinkler lines either 2—660' operating lines or one 1,320' operating line. This unit is used to a good advantage where a number of 10 or 20 acre tracts can be irrigated from one source of water. In addition it can furnish water to properties up to one and one-half miles distance from a source of water and against extreme heads. Actually you are operating two conventional 660' lines with just one pump and power unit. The time factor is increased by inserting crosses with valves into the conductor lines. With the use of one additional sprinkler line to change from one property to another the pump never ceases operation. For example, when crosses with valves are inserted in the conductor line while it is being assembled eighteen or twenty different blocks spread over a long distance, can be irrigated without ever stopping the pump. Of course, it isn't economical to use on small individual acreages due to cost of moving and setting up.

There are two factors of great importance in Portable Irrigation. They are the method employed in moving and time factor between moves. They work very closely together. It is always like working a jigsaw puzzle and shortage of pipe is usually the "fly in the ointment." Avoid successive moves where all the pipe you have is required. It is indeed difficult to always have enough pipe for any type of portable irrigation. Due to pipe scarcity during extended periods of drouth a bit of trading by various organizations has proven benefical to all involved. In other words when one organization is set up near a property of another, the organization, so set up does the irrigation for another or at least rents the pipe for that property to be irrigated prior to its being moved.

In the method of moving, is the all impotant question of what type of equipment to use in hauling the pipe. This depends on distance between moves and many times what is available to use. Almost every conceivable type of equipment is used on the Ridge. Everything from mules and sleds to semi-trailers. One oragnization comes up with a useful piece of moving equipment and it is quickly copied by others.

The time factor mentioned above is all important. This means primarily do not over extend yourself. During extended periods of drouth properties have to be irrigated even six or seven consecutive times. Therefore, to protect your interest or the Growers interest, you must be able to repeat the operation prior to the property being depleted of moisture. If you do not the previous irrigation or irrigations have gone for naught and much is lost.

Make a survey of your needs, have a reputable organization advise you as to your requirements, usually add 25% average on these requirements and you will be in position to have an economical operation.

There are indications that the Portable Irrigation in the Ridge area is being improved every year. This improvement is being made by semi-permanent installations. This is where growers are putting in an underground permanent conductor line by a cooperative plan. Portable pumps and sprinkler pipe is used. This is an excellent operational saving and reduces the time factor, as it is the moving of conductor line which is the bottleneck.

I think we are yet in the dark ages on Portable Irrigation. Much has been done in its development during the past two or three years. Yet more has to be done in lowering the cost per acre inch of water applied to the citrus groves. More Growers are thinking in terms of Water Conservation which is vitally necessary. More efficient facilities will have to be developed in reducing application costs. More research work is necessary in order that water is not wasted. This operation of Portable Irrigation will definitely develop fast if the next ten years are as generally dry as in the past ten. In closing, I urge you to start thinking and doing something about this all important problem of Portable Irrigation.

Coordinating Florida's Citrus Market

A central association can make its greatest contribution to the Florida citrus industry as a bargaining agency for processed fruit and as a market information agency for fresh fruit, according to a report just issued by the U. S. Department of Agriculture. George H. Goldsborough made the study. It is published as Miscellaneous Report 143 of the Farm Credit Administration under the title "Coordinating the Marketing of Florida Citrus Fruit."

The author drew his conclusions from data obtained from 80 Florida fresh citrus fruit shippers who market 75 percent of the fruit for fresh consumption, and 34 citrus processors who handle 95 percent of the fruit processed. He also consulted 8 non-operating Florida citrus industry leaders and 61 representatives of the fresh fruit buying trade. This study,

(Continued on Page 15)

Rio Grande Gummosis---Its Occurrence In Florida Groves[1]

In 1945 G. H. Godfrey published an article entitled "A Gummosis Associated with Wood Necrosis" (4), in which he reported what was presumed to be a new disease attacking citrus trees, principally grapefruit, in the Rio Grande Valley of Texas. This disease is considered by the Valley growers to be their most serious citrus disease.

In November of 1949, in company with Dr. Godfrey and his former assistant Mr. Carl Waibel, I saw the Rio Grande Gummosis disease on the Experiment Station grounds at Weslaco. Several days later symptoms of the same disease were seen on grapefruit trees in the Coachella Valley area of California. Subsequently Mr. Waibel informed the writer that he had assisted Dr. Fawcett in identifying the disease in California and that Dr. Fawcett was satisfied that Rio Grande Gummosis is distinct from the virus disease, psorosis. This has an interesting bearing on the early history of gummosis in Florida.

Upon returning to Florida, many gummosis lesions were examined by the writer and were found to resemble closely the trouble seen in Texas and California. Later Mr. Waibel visited Florida and confirmed the suspicion that Rio Grande Gummosis is none other than the old Florida Gummosis disease under a new name. Without going into the complete history of this disease, it should be noted that the earliest detailed description of gummosis in Florida was published by Fawcett in the Agricultural Experiment Station Report of June 1907 (1). Later he published other reports of his work on gummosis, in one of which (2) he explained how to distinquish gummosis from foot-rot (**Phytophthora citrophthora**), and from leprosis (Florida scaly bark disease). Recognition of the importance of gummosis disease in Florida reached its high point when Rhoads and DeBusk published their bulletin in 1931 (5). After that date little was published, and gummosis eventually came to be regarded as merely a name to describe any distrubance giving rise to a little gum.

This situation is the result of a peculair set of circumstances and events. In the first place some of the symptoms of gummosis are remarkably like certain symptoms of foot-rot on the one hand and like symptoms of psorosis on the other. As a result gummosis has been confused with these diseases. In addition gummosis has been known under other names such as "tears", and "gum disease", which led to confusion. Uncertainty as the identity of the causal organism has been detrimental to understanding gummosis. When Fawcett reported (3) that he had isolated **Diplodia natalensis** from gummosis lesions and that Diplodia caused more profuse gumming than any other isolate many were led to infer that Diplodia was the cause of the gumming when neither foot-rot nor psorosis seemed to fit the case. Although Fawcett reported that Diplodia inoculations did not form typical gummosis lesions (3), that fact was overlooked by many. It seems as though it was overlooked by Fawcett himself for when he later recognized the disease in California he did so under the name of Rio Grande Gummosis. However Diplodia infections cause the wood to become dark grey to black in color, which contrasts sharply with the buff and orange color typical of citrus wood infected with gummosis. Also, Diplodia readily attacks sour orange causing profuse gumming, but Stevens (6), Rhoads (5), and Godfrey (4) all agree that sour orange is highly resistant to if not immune from gummosis disease. As a result of these facts there is basis for considerable doubt that Diplodia is more than a secondary invader of gummosis lesions.

SYMPTOMS OF GUMMOSIS IN TEXAS AND FLORIDA

The symptoms of the gummosis disease as seen in Texas parallel closely the symptoms in Florida and are in close agreement with those described by Fawcett in 1907. On that basis, the disease as found in Florida, Texas, and California can safely be regarded as a single disease for which the name gummosis, as originally used in Florida, should take precedence.

Gummosis lesions may be active at any time of the year; and on lemon trees they appear to be active almost continuously. On This year (1949-1950) the disease was especially active from December through February, perhaps because of an unusually warm winter and an early spring. Since lemons ceased to be grown commercially in Florida, (due in large part to gummosis, although foot-rot is usually blamed), gummosis is most frequently seen affecting mature grapefruit trees. Any point on the trunk and larger limbs may be attacked. The following table (Table 1) adapted from Rhoads and DeBusk (5) indicates the relative susceptibility of several citrus species to gummosis.

TABLE 1. The Susceptibility of Several Species of Citrus to Gummosis as indicated by the Presence and Extent of Lesions. Adapted from Rhodes and DeBusk (loc. cit.)

SPECIES OF CITRUS	SUSCEPTIBILITY RATING
Lemon	Most susceptible
Grapefruit	Very susceptible
Sweet Orange	Moderately susceptible
Tangerine	Very resistant
Sour Orange	Most resistant

There are roughly speaking two types of lesions, depending on age and manner of infection. In appearance young infections are very similar to young infections of foot-rot, i.e., a small quantity of light-

1. Author: J. F. L. Childs, pathologist, Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture.
Presented at the Florida State Horticulture Society Meetings, Oct. 31, Nov. 1, and 2, 1950, Winter Haven, Fla.

colored gum oozing from a small spot where the bark appears slightly wet or water-soaked. However, the cambial surface of the wood beneath the gumming spot lacks the brownish-yellow stain characteristic of foot-rot infections. Frequently (at least on grapefruit trees) small woody galls or outgrowths from the wood under the bark are found associated with young gummosis infections. These outgrowths are usually green in color due to the presence of chlorophyll presumably stimulated by the disease. So far as is known such outgrowths are not found associated with foot-rot, with Diplodia infections, or with the virus disease, psorosis. Usually there is no bark scaling at the time of first gum production, although the bark may split slightly. Young lesions appear to heal by sloughing off a thin scale of dead outer bark, exposing a buff-colored scar. This occurs shortly after gumming ceases. The scar consists of callus tissue generated by the bark. Healing is only temporary, for later in the year, or perhaps the following year, gum exudes again, and additional scales of bark slough off, thus enlarging the lesion and repeating the cycle. In the course of repeated gumming and scaling, the lesions enlarge to cover a considerable area, and in time the wood becomes exposed. The direction of greatest enlargement is parallel to the axis of the rtunk or limb and not around the circumference, as is the case with the psorosis. In addition, psorosis lesions always look ulcerated and give no appearance of healing, even temporarily. In foot-rot lesions the bark is killed down to the wood and is subsequently sloughed off as a single slab, and any healing that occurs takes place at the margins of the lesion.

In older infections of gummosis the disease usually has penetrated deep into the wood, and as a result it is often necessary to chisel through a half inch or more of healthy wood to expose the gummosis infection. When thus exposed the cut surface of the infected wood is seen to be a buff or buckskin color usually banded and bordered with a salmon-orange color that deepens in shade when exposed to the air. The banded appearance is due to the wood of certain growth rings having become impregnated with gum. Frequently gum collects in lens-shaped pockets that cause the outer layers of wood and the bark to become raised as though by large blisters. When these "gum pockets" break through to the surface large quantities of semi-liquid gum are released. The cavities vary in size, some being half an inch thick by an inch wide by two inches long, and the internal walls are usually covered with small gall-like protuberances that sometimes enlarge to the point of filling the cavity. The disease appears to penetrate long distances through the wood so that gum pockets may be formed at a considerable distance from the nearest bark lesion. The importance of the gum pockets in diagnosing gummosis disease was noted by Fawcett in 1907.

TABLE 2. Differences and similarities in the Symptoms of Foot-rot (**Phytophthora citrophthora**), Gummosis (cause unknown), and Psorosis (virus).

Disease symptoms	Foot-rot	Gummosis	Psorosis
Gumming	Heavy	Very heavy	Practically none
Bark Sloughing	Entire bark thickness	Outer scales	Outer scales
Gum Pockets in Wood	None	Common	None
Color of Affected Wood	Yellow to Brown	Buff with Salmon Bands	Brown
Casual Organism	Fungus	Unknown	Virus

A summary of the more characteristic symptoms of gummosis is presented in Table 2, in comparison with the symptoms of foot-rot and psorosis, the two diseases with which it is most frequently confused.

CAUSAL ORGANISM

At present the cause of gummosis must be considered as unknown since there is no published record of typical symptoms of gummosis having been produced by inoculation with a pure culture of any organisms or with a virus. The causative agents of foot-rot, psorosis, and Diplodia infection have been satisfactorily disposed of as possible causes of gummosis, and many years ago in Florida Fawcett (3) showed that uninfected mechanical injuries to citrus trees did not gum. It is true that certain chemicals stimulate gum forma-

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The Land Grant Colleges . . .

When men of vision first proposed colleges specializing in agricultural subjects more than a century ago, their wildest day dreams could not have encompassed the Land Grant College system which today has a profound effect on nearly every American farm.

Today's Land Grant Colleges, through their on-campus teachings, their experiment stations ever seeking for new and better farming methods, and their vast extension services through which these new methods are funneled to the farmer, are a major cog in the American system of higher education.

The nation's 52 Land Grant Colleges in 1948-1949 had an erollment of 498,455 full time students. Approximately 57,000 staff members are employed by these institutions. There is at least one Land Grant institution in each of the 48 states and the territories of Alaska, Hawaii and Puerto Rico.

The Land Grant institutions are by no means confined to the teaching of agriculture, as they offer instructions in arts and sciences, architecture, dentistry, engineering, home economics, law, medicine, nursing, pharmacy, and other professions in addition to courses on agriculture.

In virtually every county in the United States, the influence of the Land Grant Colleges is felt through the county agent (called "farm advisor" in some states). Farmers have come to look on the county agent as a walking Bible of good farming methods. He it is who finds the solution to the many diversified farm problems peculiar to each area. If the solution isn't available in his store of information accumlated during his years of personal association with farming, he has the resources of the Land Grant College to fall back on.

The county agent also encourages the use of new methods and equipment that will help farmers raise more products and better products at less cost to himself and to the consumer. And it's not only in the field or barn that the college extension service assists the farmer, but also in the farm home through the helpful home demonstration agents. In fact, there are few phases of farm life that do not feel the direct impact of the Land Grant Colleges.

Morrill Act Was Starting Point

Agitation for colleges specializing in agricultural subjects first became noticeable in the middle of the nineteenth century. The movement reached Congress in the form of the Morrill Act which was vetoed in 1859 by President Buchanan. The act was reintroduced and passed, becoming law in 1861 with the signature of President Lincoln.

The fundamental purpose of the Morrill Act was to insure the development in each state of at least one college adapted to the educational needs of the people of agriculture and industry. Under its provisions, a system of colleges and universities owned and controlled by the several states, but conforming to broad policy stipulations of federal law, has been established.

The federal support provided in the initial Morrill Act was the income from public lands (30,000 acres or equivalent in scrip for each representative and senator in Congress) which was made available to each state. The state was expected to contribute to the maintenance of its Land Grant institution as well as to provide its campus and buildings.

From this modest beginning the federal government has expanded its contributions to the Land Grant Colleges and Universities. Recognizing the need for research as a basis for developing agriculture, the Congress passed the Hatch Act of 1887 setting up in the Land Grant institutions the system of agricultural experiment stations. In 1890 the second Morrill Act and in 1907 the Nelson amendment were passed, supplementing by direct appropriation the income from the Land Grants to finance instruction.

In 1914 the Smith-Lever Act was passed, establishing the system of cooperative extension services to spread even wider the benefits of current developments in the field of agriculture. Thus, by 1914, these institutions, designed to foster a program of education suited to the needs of agriculture and industry, had been established on a foundation of research, and their services extended from the youth on the campus to the adult population throughout the rural areas of the state.

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RIO GRANDE GUMMOSIS; ITS OCCURENCE IN FLORIDA GROVES

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tion, but the remainder of the symptom picture is lacking, i.e., cycles of gumming and healing, gum pockets, and certain other features have not been found associated with chemically induced gumming. The only other causal agent worth consideration at this time is the one reported from Texas. Godfrey found what he describes as an actinomycete-like fungus associated with the disease. Up to the time I talked with him in 1949 he had been unable to obtain this organism in pure culture, but he has been able to cause the disease on numerous occasions by inoculations with chips of diseased wood. Although this organism is suspected, its causal relationship has not been proved.

CONTROL

From the citrus grower's point of view, emphasis on the identity of the causal organism is somewhat academic. What he wants to know is how the disease spreads and how it can be stopped. Old gummosis infections in Florida and in Texas indicate that pruning wounds are the most important point of entry of gummosis, with other bark injuries only slightly less important. In Texas the disease is sometimes referred to as "wet-back" disease because it is so often associated with bark injuries caused by Mexican fruit pickers, "wet-backs", who frequently climb the trees when picking fruit. Whether the organism can penetrate through uninjured bark is not known, though judging from some of the young lesions seen in Florida this year, it seems that it can. However, young infections that take place through the bark are easily cared for, and do not present the same hazard as infections arising in the wounds that result from cutting off large branches. The practice has been to remove large branches by sawing them off as close to the trunk as was convenient and to let the stump heal over as best it could. Even under the most favorable circumstances, it takes several years for a large pruning wound to heal over. In the meantime, the wound is open to infection by gummosis and other diseases.

All pruning wounds three-quarters of an inch in diameter or larger should have a wound disinfectant applied to them. For this purpose few materials are as satisfactory as Avenarius or Red Arrow carbolineum. In addition, any wound 1½ inches or larger should have a coating of water-emulsified asphalt applied to the carbolineum dressing one week afterwards. Such treatment will maintain the wound surface in a dry, fungus-repellant state until the bark has healed over it.

Painting the surface of an old wound will not eradicate gummosis from deep in the wood. Old infections will have to be excavated with a chisel or gouge. All the discolored diseased wood should be removed and, after several days of drying, the surface should be treated with carbolineum and asphalt emulsion as in the treatment of new wounds. When gummosis disease has been established a long time the grower will have to determine whether the tree is worth the expense of treatment. Young lesions are easily excavated and heal over in a short time if proper dressings are applied. However gummosis lesions that have apparently healed over without adequate treatment are still alive and will break out with renewed activity at a later date. The proper treatment of wounds is an excellent example of the adage that an ounce of prevention is worth a pound of cure.

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PRESENT STATUS OF SPREADING DECLINE

(Continued from Page 7)

maldehyde solution should be effective as a barrier. The barrier would be examined periodically and when the roots started to grow back into the treated soil, the chemical would be applied again. A system of barriers at different distances ahead of the margin has been established in nine groves. Formaldehyde at 3 gallons to 100 gallons of water was injected into the soil at the rate of 2 gallons of solution per 5 feet of barrier. It is possible that some results will be obtained by 1952.

If either or both of the above mentioned measures of pulling marginal trees or using a chemical barrier will stop the spread of the decline, then the problem remains as to a satisfactory treatment for the soil so that replants will grow properly. In February, 1948, two blocks of spreading decline trees were removed and the soil treated with D-D at 400 pounds per acre. The treated areas were replanted with budded trees and records on growth are being obtained. After two years, the trees planted in the treated soil are making better growth than those in the non-treated soil. The data from one of the blocks are shown in Table 6. The D-D is not a good fungicide, but at the rate used has some fungicidal effect.

In another experiment rough lemon seedlings were planted in decline and virgin soils which had been treated with D-D, formaldehyde and ethylene dibromide in December 1948. In October 1950, 6 out of 18 seedlings in the non-treated decline soil had died and the remaining plants had grown about two-thirds as much as the seedlings in the treated decline soil or in the non-treated or treated virgin soil. Final records have not been made but there does not appear to be any significant difference in the growth of the seedlings whether in treated decline soil or in the non-treated or treated virgin soil.

To obtain additional information on various materials that might be effective as a soil treatment, a series of tests were started in May 1950. A total of 56 materials are in the test. It may be possible to obtain some information by the spring of 1951.

SUMMARY

Groves in which spreading decline is present in Florida are located in Polk, Orange, Highlands and Hillsborough counties. Over a five year period, the average rate of spread of the decline in all groves mapped was 1.6 trees per tree on the margin of the decline area. During the same period, the number of trees with the disease increased from 2 to 9 times in different groves.

Spreading decline appears to be the result of a fungus infection of the fibrous roots. A **Fusarium** sp. and an unidentified fungus have been consistently isolated from the roots of diseased trees. Indirect evidence obtained by means of the "wilt test" has indicated that a Fusarium may be the causal agent.

Tests on the respiration and catalase activity of rootlets and leaves of diseased and healthy citrus trees indicated that the disease may extend to the third or fourth healthy tree ahead of the margin of the decline area. Any attempt at controlling spreading decline by removal of the trees should also in-

clude at least four healthy trees ahead of the margin.

Rough lemon seedlings have made better growth when the decline soil was treated prior to planting with D-D, formaldehyde or ethylene dibromide in pot experiments. Field tests with D-D at 400 pounds per acre appear promising.

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THE LAND GRANT COLLEGES

(Continued from Page 12)

In the second Morrill Act of 1890, Congress included a clause requiring that Land Grant Colleges make no distinction of race or color in their admission requirements. The law permitted a state in satisfaction of the above stipulation to maintain one college for white students and another for colored students. Seventeen states now maintain separate Land Grant Colleges for Negroes.

Michigan Has First Agricultural College

Michigan State College, established in 1855, is recognized as the first agricultural college of its type actually in operation. Iowa State was the first to be designated by its state legislature as a Land Grant institution in September 1862. Rutgers University in New Jersey was chartered in 1766 although it did not become a Land Grant institution or organize an agricultural department until sometime after 1864.

The youngest among the Land Grant group is the University of Alaska at College, Alaska, which first was provided for in 1915 and opened its doors in 1922. It also is the smallest, having a total enrollment of 334 in 1947-48.

The University of California is the largest with an enrollment of 48,000 students on its eight campuses.

The whole realm of higher education in the country has been profoundly influenced by the development of Land Grant Colleges and Universities. They have successfully demonstrated the partnership of the federal and state governments in the maintenance of a system of higher education designed to fulfill a wide range of needs. They have broadcast the concept that higher agricultural education is something in which all people have a stake.—From information provided by the Dearborn Motors Corporation.

COORDINATING FLORIDA'S CITRUS MARKET

(Continued from Page 9)

made under the Research and Marketing Act, covered material on the 1948-49 season.

Of all those expressing opinions on the need for establishing an industry marketing organization, 93 percent favored the development of such a central marketing program.

The study goes into considerable detail on the various methods of selling used by Florida fresh fruit shippers and processors. It also gives some comparisons on the relative efficiency of the Florida and California fresh fruit marketing systems.

Over the past 30 years, several efforts have been made in Florida to bring about industry-wide organization. Florida Citrus Mutual, at Lakeland, just organized in 1949, is the latest. It is a non-stock overhead cooperative owned and controlled by citrus growers. At present, its program covers principally the establishment, when nec-

(Continued on insde back cover)

The LYONIZER

Department

COMPILED BY THE LYONS FERTILIZER CO.

The Outlook

Florida's agricultural outlook today is infinitely more encouraging than was the case just a few dags ago, when a cold wave had enveloped virtually all of the United States and killing cold was predicted for Florida, with every indication that Florida's great citrus crop might be completely destroyed.

It is true that we have had a cold spell and that most vegetable crops have been destroyed, but the damage done to citrus over the state with the possible exception of tangerines has been virtually negligible, and while we cannot attempt to forecast the balance of the season, certainly most every grower in Florida has reason to feel that we have been lucky this year.

Only a short time ago we spent several weeks mentally dodging the largest series of hurricanes which has ever threatened the state in any one past season. It is true that one hurricane did some serious damage in the Miami and in the southeast Florida area, but it is equally true that time after time hurricanes which were scheduled to sweep through Florida's great citrus area changed their course before doing any appreciable damage.

So with the recent escape from one of the most serious freezes forecast in Florida in many years every citrus grower has reason to feel that luck has been riding with most of us.

Most of Florida's citrus groves are in need of rain, but generally the state's groves appear in good condition and the majority of growers have applied their Fall application of fertilizer, with the result that if our luck holds throughout the season as it has thus far Florida growers have every prospect of being able to market their citrus crops at a satisfactory price.

In areas where vegetables were seriously damaged work is already proceeding with the work of preparing their fields for replanting.

ADVERTISEMENT — LYONS FERTILIZER COMPANY

We've been 'round these parts fer quite some time now and we've seen times when a lot of folks thought the country was goin' to the devil . . . and we've seen some purty tough times, when even grits and bacon wasn't too plentiful . . . but somehow or other we've always managed to come out of our troubles and land right side up . . . so in spite of everything that is goin' on in the world today we are still convinced that we'll do as we always have and finally land on our feet.

Of one thing we are sure certain . . . and that is that the citrus business in Florida is one of the best in the world . . . there's been hard times in this business just like they's been in every other business . . . but dollar for dollar invested in a good Florida citrus grove, we'd say year after year the returns from Florida grove investments is among the best in the world.

'Course now and then we have bad seasons just the same as the storekeeper or the manufacturer . . . cold weather and bugs of different sorts sometimes make it tough, just like too much rain or no rain at all . . . but in any business that we know anything about there's problems which must be faced and overcome.

Not over three years ago we was worryin' because there was too much fruit for the market . . . then came along this Florida concentrate, which is now using a great big hunk of the total Florida citrus crop, and there's every reason to think that consumption of this product will continue to increase, and together with the amount of single strength juice bein' used and the sectionized fruit bein' sold, along with the still tremendous amount of fresh fruit bein' sold that it'll be a long, long time before we reach a state of over production . . . if we ever do.

So takin' it all in all we're mighty proud to be a part of this state's great citrus industry . . . and in addition to bein' proud we've a sneakin' suspicion that we're lucky, too . . . just like a lot of other folks who are a part of this great industry.

Uncle Bill

CAR SUPPLY STUDIED BY GROWERS & SHIPPERS LEAGUE

(Continued from Page 4)

built new, rebuilt and modernized 7,050 cars and that they now have on order 1,200 refrigerator cars for the FGE., and since receipt of this letter I am advised that the WFE have ordered another 450 cars. This makes a total since January 1, 1946 of 9,700 new or rebuilt refrigerator cars for these affiliated companies, which cost in excess of $61,580,000.

This fleet however is not adequate to take care of the needs of the shippers of perishable foods in the southeastern states and other areas served by the Fruit Growers Express and affiliated companies. Spokesmen for the government and car lines appearing on the program of the International Apple Association in Washington were very discouraging in their statements concerning car supply and the possibility of building up the fleet of cars in the relatively near future.

Representative Harris Ellsworth of Oregon has introduced a bill in Congress which proposes to form a government corporation to accumulate a pool of freight cars for assignment to the various carriers as needed on a rental basis. The corporation would have a capitol of $250,000,000, and would be known as the Railroad Car Reserve Corporation. The provision of the Ellsworth bill would place operation of the corporation in the Commerce Department which would in turn set up an Advisory Board of six officials from the railroad industry on a geographic basis.

Chairman Johnson of the Interstate Commerce Commission has been devoting a great deal of time to the car supply situation and in a recent meeting, called by the Chairman of the Senate Committee on Interstate Commerce, took Mr. W. T. Faricy, President of the Association of American Railroads to task disputing the A.A.R. President's figures in regard to the freight car situation.

Chairman Johnson presented a letter that he had written to Representative Beckworth, in which letter he said in part, "This advertisement and numerous utterances of the Association of American Railroads have reassured the public that the railroad situation is in good shape when the contrary is emphatically the case."

All in all the car situation is certainly far short of what it should be and there now appears to be a controversal issue confronting the fresh fruit and vegetable industry that should be clarified without delay.

At a recent meeting of the Advisory Board of the National League of Wholesale Fresh Fruit and Vegetable Distributors a resolution was adopted recommending that the railroads immediately start a building program of refrigerator cars but that these cars preferably be of the giant Canadian type and size, or 50 foot overhead bunker cars.

The Refrigerator Car Committee under the Chairmanship of John Kelley has been studying this situation for some six years and recommended several years ago that the railroads construct cars of standard dimensions which are the 40' cars and that from experience it had been found that a car of this size would suit the industry best and would fill the majority needs.

The size of refrigerator cars is very important to this industry's future and so that the League may be squarely on record with both national organizations as well as the railroads and car lines I respectfully ask that you immediately advise what our recommendations should be relative to the size of refrigerator cars.

AN APPRECIATION FOR A FINE GIFT

Donald J. Nicholson, proprietor of the Royal Purple Citrus Research Nursery at Orlando has the thanks and appreciation of the editor and office force of this publication for the gift of a box of his fine "Dream Navel Oranges," a variety which he developed over a period of many years. The Royal Purple Citrus Research Nursery by-the-way is not a commercial nursery, but rather a proving ground for the development of new varieties and the improvement of old ones.

The box sent this office consisted of fruit just as it came from the tree without any artificial coloring, grooming or "dolling up" process, and the fruit was duly sampled by the various members of the office force and was pronounced of super-excellent quality.

There may possibly be a better orange somewhere in the world than those contained in our gift box—we don't know, since we have not sampled every variety of orange grown throughout the world—but certain it is that if all the early oranges shipped out of Florida possessed the quality of those we sampled there would be no complaint from Northern tradesmen or consumers about the shipment of "green" and "unripe" fruit.

Certainly the work of Mr. Nicholson in the development and improvement of Florida citrus varieties is amply demonstrated in the development of this variety of early orange.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC. REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946, OF THE CITRUS INDUSTRY, PUBLISHED MONTHLY AT BARTOW, FLORIDA, FOR OCTOBER 1, 1950.

STATE OF FLORIDA,
COUNTY OF POLK.

Before me, a notary public in and for the State and county aforesaid, personally appeared S. Lloyd Frisbie, who having been duly sworn according to law, deposes and says that he is the Business Manager of The Citrus Industry and that the following is to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Associated Publications Corp., Bartow, Fla.

Editor — S. L. Frisbie, Bartow, Fla.

2. That the owners are:

Associated Publications Corporation, Bartow, Florida.

S. L. Frisbie, Bartow, Fla.

S. Lloyd Frisbie, Bartow, Fla.

Loyal Frisbie, Bartow, Fla.

Richard R. Frisbie, Bartow, Fla.

B. L. Gable, New York, N. Y.

F. L. Skelly, Orlando, Fla.

B. W. Skinner, Dunedin, Fla.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

Mosel Preston, Auburndale, Fla.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiducary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold than that of a bona fida owner.

S. LLOYD FRISBIE
Business Manager

Sworn to and subscribed before me this 25th day of October 1950.

CLYDE GIBSON, Notary Public
My commission expires Feb. 26, 1951.

Shippers Save In Simple Ways Developed By USDA Research

Research on storage and transportation of fruits and vegetables, as carried on by the Plant Industry Station of the U. S. Department of Agriculture, has been notable for discoveries resulting in economies in the use of various materials and equipment.

The studies of these scientists (including engineers, pathologists and horticulturists) during the past year or so have brought out what might be called protective savings for shippers.

One case has to do with the gases given off by many fruits in storage or transit that hasten ripening. Devices had been put on the market to free the air of these gaseous by-products. But tests by the Department scientists showed that, at least with apples and pears, the purifier did little more than remove odors. The fruits kept as well without as with.

When it came to shipping flowers by air, a widespread belief developed that pressurized cabins were the thing to keep cut blooms from going bad (that is, such defects as split petals, blasted buds) at high altitudes. But tests in cooperation with the Southern California Floral Association and the Lockheed Aircraft Corporation proved to the investigators that the chief deterioration in high flights came from drying, and such loss, they found, could be largely prevented by using ordinary water ice in the present type of package.

The investigators recently have tried out heater-refrigerator cars with built-in heating systems, but temperatures were no better than when fans and portable charcoal heaters were used according to the present common practice.

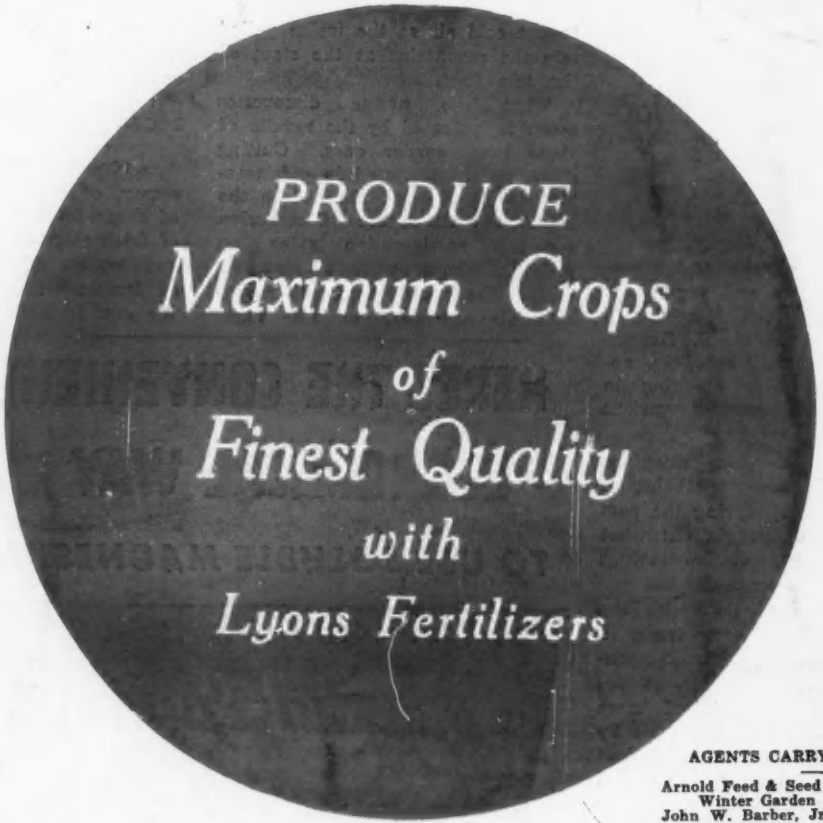
These discoveries are right in line with some of the earlier ones made by this research group. Years ago they found it possible to keep cars cool with much less ice, at a saving not only of ice but in the cost of transporting excess ice across the country. Then, not quite so long ago, they found that shippers of California oranges could save on refrigeration in transit by opening the car ventilators to the cold air as the trains pulled into the mountains at the start of the trip East.

What the newer discoveries mean is indicated by the results of these two earlier ones. Cutting down on the ice used in refrigerator cars in general, resulted in the Interstate Commerce Commission reducing refrigeration rates on such shipments by 22 percent. By cooling the orange cars with mountain air according to new regulations that resulted from tests, the growers are saved about $40 on each car.

COORDINATING FLORIDA'S CITRUS MARKET

(Continued from Page 15)

essary, of week-to-wwek allotments of fresh fruit shipments, allotment of fresh shipments to auction areas, and setting minimum f.o.b. prices of fresh fruit and minimum prices for raw fruit for processing.



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